AMENDMENTS TO THE SPECIFICATION:

On page 8, please amend the paragraph extending from lines 8 through 9 as follows:

-- FIGURE 5 shows sets of generalized aerodynamic ~~forces~~ force elements computed using the vortex lattice formulation of FIGURE 3; --

On page 12, please amend the paragraph extending from lines 5 through 18 as follows:

-- Embodiments of the present invention include implementing the SCI/ERA method for fast and efficient model reduction of linear, finite-dimensional, discrete-time systems with multiple inputs. To accommodate the SCI within the framework of the Pulse/ERA, it is necessary to modify the original algorithm. In particular, as shown below, the new formulation does not rely on the system Markov parameters explicitly. Instead, it performs the singular-value-decomposition (SVD) directly on the output measurements that are in general not attributed to pulse inputs. Statistically independent random numbers are used in lieu of the pulses for the multiple input signals. Naturally, embodiments of the present invention can also be used towards experimental system identification provided that all the time measurements are available from experiments. Application of the SCI/ERA method 200 to computational fluid dynamic systems and formulation of reduced-order aeroelastic models are presented below, where it is shown that depending on how the displacement and velocity inputs on the moving boundary are treated, two different kinds of reduced-order aerodynamic and aeroelastic models may be generated. --

On page 31, please amend the paragraph extending from lines 7 through 13 as follows:

-- FIGURE 5 shows three sets of generalized aerodynamic ~~forces~~ force elements 500 computed using the vortex lattice formulation of FIGURE 3. Specifically, FIGURE 5 shows (6 x 6) generalized aerodynamic forces for V=80 *m/sec* obtained from the FOM, ROM I.-FDKL, and

ROM II.-FDKL models (FOM (800), ROM I.-FDKL(129), and ROM II.-FDKL(97)), in the nondimensional time, τ. It is seen that despite the cut-off frequency range present in the latter two models, they reproduce the pulse aerodynamic responses of the original model very well. --

On page 31, please amend the paragraph extending from lines 23 through 25 as follows:

-- FIGURES 8 and 9 show time responses of the first two structural modes 800, 900 due to an initial condition in <u>velocity $\dot{u}_1$</u> [[$\ddot{u}_1$]]. It can be seen that the three sets of curves are practically indistinguishable from each other. --

On page 34, please amend the paragraph extending from lines 13 through 22 as follows:

-- The computational aerodynamic model consists of approximately 700,000 cells and 30 blocks. For detailed description of the modeling, see Hong, M.S., Bhatia, K.G., SenGupta, G., Kim, T., Kuruvila, G., Silva, W.A., Bartels, and R., Biedron, R., *Simulations of a Twin-Engine Transport Flutter Model In the Transonic Dynamics Tunnel*, IFASD Paper 2003-US-44, incorporated herein by reference. Also, the details of the computational model and construction of the aerodynamic and aeroelastic ROMs based on the SCI/ERA using various types of input signals mentioned earlier is described more fully in Kim, T., Hong, M.S., Bhatia, K.G., SenGupta, G., *Aeroelastic Model Reduction for an Affordable CFD Based Flutter Analysis*, AIAA Paper 2004-2040, published subsequent to the filing of the present application <u>in the AIAA Journal at Vol. 43, No. 12, December 2005, pp. 2487-2495</u> and incorporated herein by reference. --

On page 45, please amend the ABSTRACT as follows:

-- Methods and systems for model reduction and system identification of dynamic systems <u>with multiple inputs</u> are disclosed. In one embodiment, a method includes generating a plurality of statistically independent random numbers for use as input signals, and performing a singular-value-decomposition directly on the system response due to a simultaneous excitation of the plurality of input signals. Alternate embodiments further includes sampling individual pulse responses for the first two time steps, and constructing Hankel-like matrices from which the state-space system matrices (**A, B, C, D**) are obtained. Since the system response is sampled almost exclusively for the single representative input, the model construction time is significantly reduced, especially for a large-scaled dynamic systems. The plurality of input signals may be filtered through a low-pass filter. Alternately, the plurality of input signals may also include applying multiple step inputs in a sequential manner, and applying multiple pulse inputs in a sequential manner. --